Claims

1-26. (Cancelled)

27. (Original) A method of producing first and second aspheric surfaces on a precision optical element having a radial dimension, comprising the steps of:

forming said first aspheric surface on said element;

forming on a vacuum chuck, a support surface having a width in its radial direction less than 50% of said radial dimension of said element, and having an aspheric form matching that of said first aspheric surface formed on said element; and

subsequently forming said second aspheric surface on said element while it is held with said first aspheric surface in said vacuum chuck.

28. (Currently amended) [[A]] The method of producing first and second aspheric surfaces on a precision optical element according to claim 27, ~~and~~ wherein at least one of said steps of forming said first aspheric surface and of forming said second aspheric surface of said element comprises a machining step.

29. (Currently amended) [[A]] The method of producing first and second aspheric surfaces on a precision optical element according to claim 27, ~~and~~ wherein said step of forming on a vacuum chuck a support surface comprises a machining step.

30. (Currently amended) [[A]] The method of producing first and second aspheric surfaces on a precision optical element according to claim 27, ~~and also~~ further comprising the step of machining a diffractive optics pattern on at least one of said aspheric surfaces.

31. (Currently amended) [[A]] The method of producing first and second aspheric surfaces on a precision optical element according to claim 27, ~~and~~ wherein the precision of said optical element is such that the maximum peak to valley irregularity of at least one of said first and second surfaces is less than one wavelength of red Helium-Neon laser light.

32. (Currently amended) [[A]] The method of producing first and second aspheric surfaces on a precision optical element according to claim 27, ~~and~~ wherein ~~the volume inside of said support surface of said vacuum chuck accommodates a vacuum~~ said support surface has a volume formed radially inside of it, said volume accommodating a vacuum.

33. Currently amended) [[A]] The method of producing first and second aspheric surfaces on a precision optical element according to claim 27, ~~and~~ wherein said vacuum chuck comprises at least one passage within said support surface which accommodates a vacuum.

34. (Currently amended) A method of producing first and second aspheric surfaces on a precision optical element, comprising the steps of:

forming said first aspheric surface on said element;

forming on a vacuum chuck ~~chuck,~~ a support surface having an aspheric form matched to said first aspheric surface formed on said element, said support surface ~~having~~

~~a major portion removed~~ being such that when said element is held in said chuck said support surface is in contact with said first aspheric surface of said element only over a minor part of the complete area of said first aspheric surface; and

subsequently machining said second aspheric surface on said element while it is held with said first aspheric surface in said vacuum chuck.

35. (Currently amended) [[A]] The method of producing first and second aspheric surfaces on a precision optical element according to claim 34, ~~and~~ wherein said step of forming said first aspheric surface of said element comprises a machining step.

36. (Currently amended) ~~A~~ The method of producing first and second aspheric surfaces on a precision optical element according to claim 34, ~~and~~ wherein said step of forming on a vacuum chuck a support surface comprises a machining step.

37. (Currently amended) [[A]] The method of producing first and second aspheric surfaces on a precision optical element according to claim 34, ~~and also~~ further comprising the step of machining a diffractive optics pattern on at least one of said aspheric surfaces.

38. (Currently amended) [[A]] The method of producing first and second aspheric surfaces on a precision optical element according to claim 34, ~~and~~ wherein the precision of said optical element is such that the maximum peak to valley irregularity of at least one of said first and second surfaces is less than one wavelength of red Helium Neon laser light.

39. (Currently amended) A vacuum chuck for implementing the method of claim 27 for producing first and second aspheric surfaces on a precision optical element, ~~holding a precision optical element having a first aspheric surface, for single point machining of a second aspheric surface thereon,~~ said chuck having a support surface on which said first aspheric surface of said element is seated, said support surface having an aspheric form matching that of said first aspheric surface of said element, ~~wherein a major portion of said support surface is removed~~ and having a width in its radial direction less than 50% of said radial dimension of said element.

40. (Currently amended) A vacuum chuck according to claim 39, ~~and~~ wherein said support surface has a ~~the~~ volume formed radially inside of it, said volume ~~said support surface accommodates~~ accommodating a vacuum.

41. (Cancelled).

42. ((Cancelled).

43. (Currently amended) A vacuum chuck according to claim 39, ~~and~~ wherein said support surface is such that a major portion of said first aspheric surface of said element is unsupported when said element is seated in said chuck.

44. (Cancelled)

45. (New) A vacuum chuck for implementing the method of claim 34 for producing first and second aspheric surfaces on a precision optical element, said chuck having a support surface on which said first aspheric surface of said element is seated, said support surface having an aspheric form matching that of said first aspheric surface of said element and being in contact with said first aspheric surface only over a minor part of the complete area of said first aspheric surface.

46. (New) The vacuum chuck of claim 45 wherein said support surface has a volume formed radially inside of it, said volume accommodating a vacuum.

47. (New) The vacuum chuck of claim 45 further comprising at least one passage within said support surface that accommodates a vacuum.

48. (New) An optical system comprising at least one precision optical element, machined in the vacuum chuck of claim 45.

49. (New) The vacuum chuck of claim 45 wherein said support surface is such that a major portion of said first aspheric surface of said element is unsupported when said element is seated in said chuck.